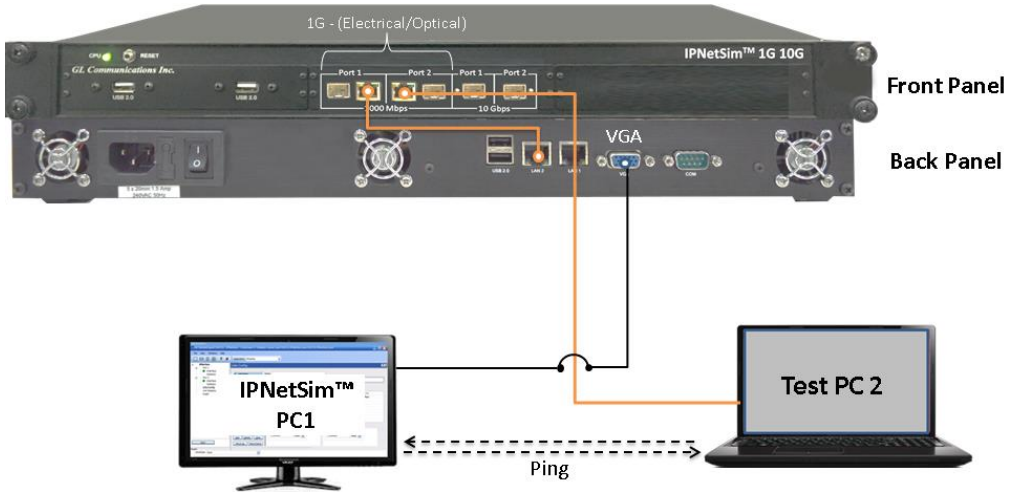
If this is your First-Time-Use of IPNetSim™ rack option, then we recommend you to follow all the steps explained in IPNetSim-Quick-Install-Guide before proceeding with the steps below.

Quick Checkout

The IPNetSim™ 1G functional verification can be performed using a single IPNetSim™ 1G/10G hardware unit.

'IPNetSim' test scenario is demonstrated on 1G/10G rack unit and a Test PC, where Ethernet port of Rack PC is connected to Port 1 (1G) of IPNetSim™ hardware unit and Ethernet port of PC2 is connected to Port 2 (1G) of IPNetSim™ hardware unit using Ethernet cables, as shown in the figure.



The IPNetSim™ application and the related license are pre-installed on the rack PC. Plug the monitor and get started with the application as explained in the steps below.

Before we perform the actual test, perform the following changes in both the Rack PC and PC2. Disconnect PCs from the public or private networks and create a small isolated network. Turn-off windows firewall for both private and public networks on each PC. Assign Static IP address to each PC, subnet masks, and default gateway addresses.

The IPNetSim™ acts as a transparent bi-directional link between PC1 and PC2, and they work as if connected directly, back-to-back.

This is the simplest possible network configuration, and helps configuring WAN conditions in a simple lab setup, emulating real world conditions without any elaborate setup.

We will conduct a simple Ping test between IPNetSim™ PC1 and Test -PC2, verify the basic Stream Definition and WAN Emulation functionality.

Note: *To use LC optical cables (for Optical Interface) in the following test, requires NIC card with optical ports on the PC.*

Step 1: Note down the IP Addresses of PC1 and PC2

We need IP addresses of PC1 and PC2 to conduct Ping test. Note down the IP addresses of both the PCs. In this example, the IP Addresses used are:

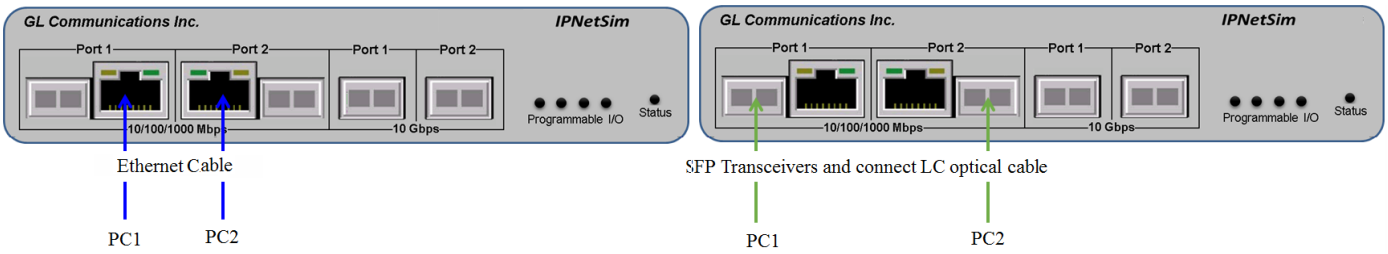
- PC1 – 192.168.1.60
- PC2 – 192.168.1.127

Step 2: Connect the cables

Perform Test on Port 1 and Port 2 (Electrical or Optical Interface)

- For Electrical Interface type, connect Port 1 to PC1 using Ethernet cable as shown in the figure. Connect Port 2 to PC2 using Ethernet cable
- For Optical Interface type, plug-in SFP Transceivers to the optical ports and connect Port 1 and PC1, and connect Port 2 and PC2 using LC optical cable (refer to figure).

Note: Make sure SFP is properly locked and the optical cable is properly plugged-in



Step 3: Launch IPNetSim 1G Application

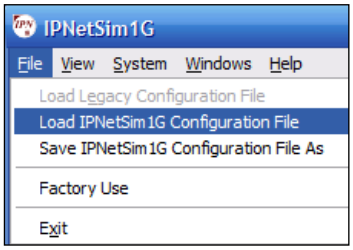
- Double click on the IPNetSim1G shortcut icon 

created on the desktop and the application should invoke without any errors.

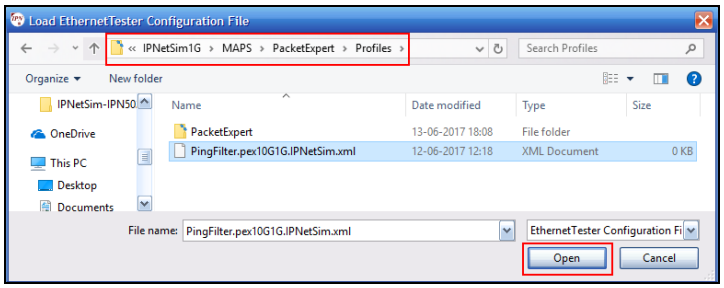
Note: The application may take some time to get started due to hardware and software initializations.

Step 4: Load the pre-configured Stream definition

- From IPNetSim main screen, go to **File** menu → select **Load PacketExpert Configuration File** option.

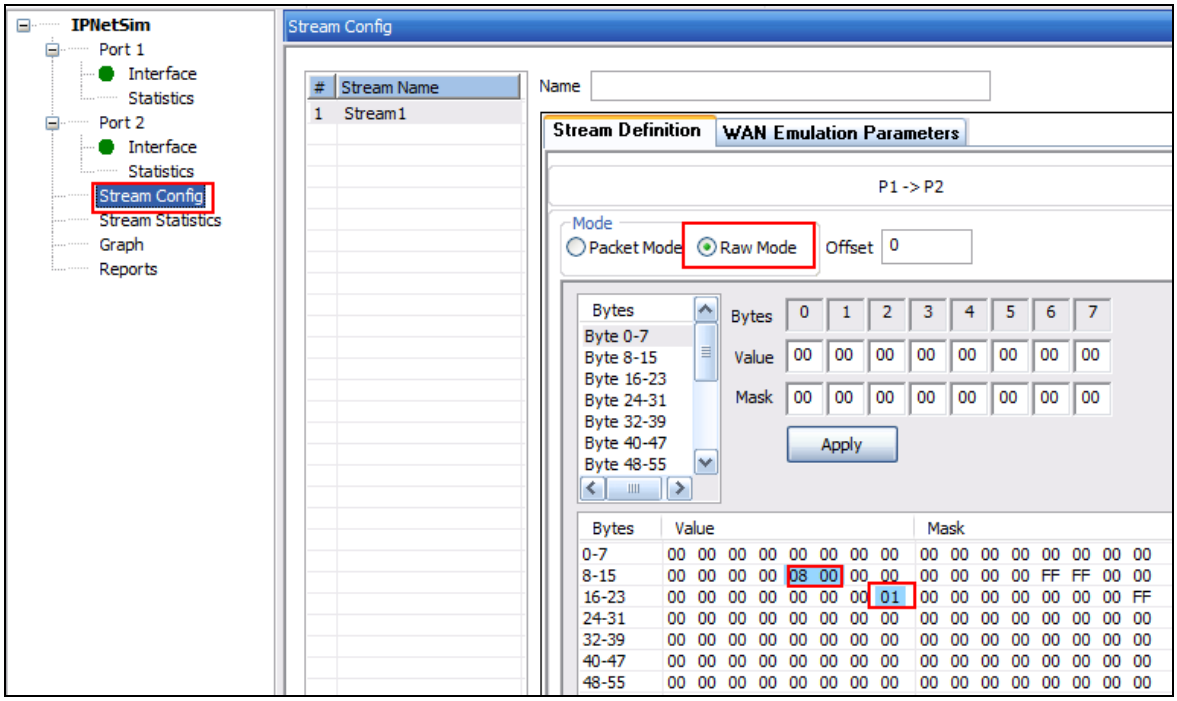


- The Load Configuration file dialog pops up. Navigate to the IPNetSim 1G installation folder, eg: C:\ProgramFiles(x86)\GL Communications Inc\IPNetSim1G\.MAPS\PacketExpert\Profiles folder. Select **"PingFilter.pex10G1G.IPNetSim"** file and click **"Open".**

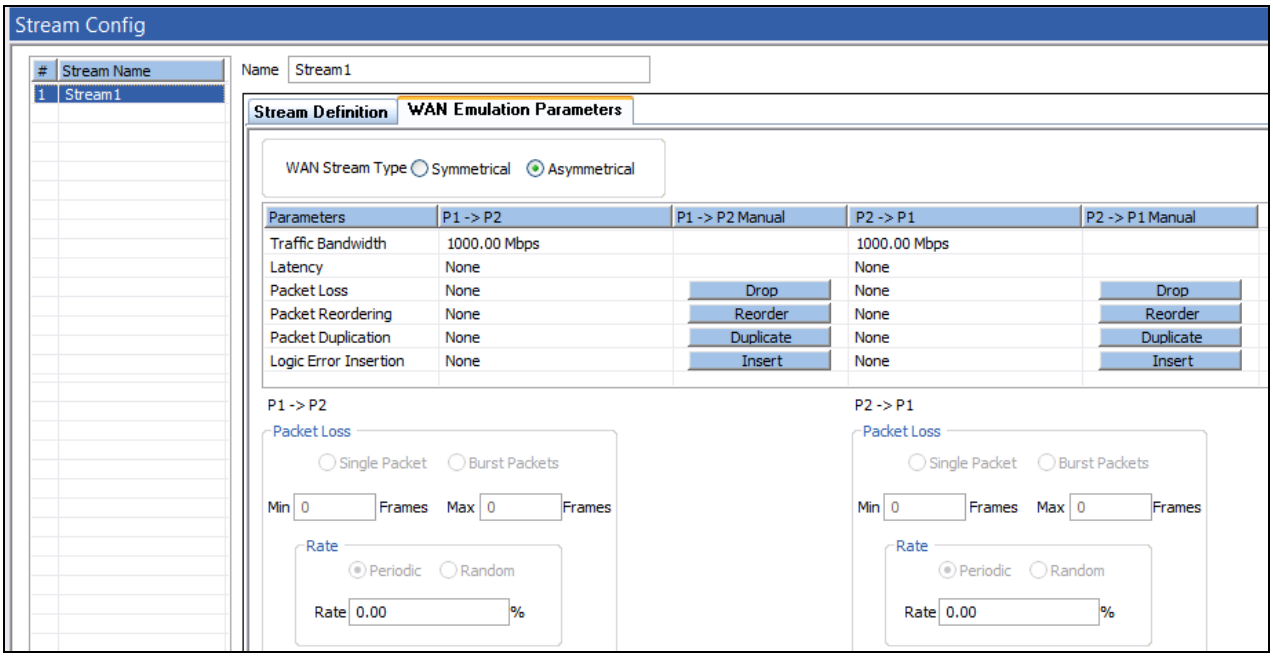


- On clicking "**Open**", the configuration file is loaded. This predefined configuration file includes a single stream, which is pre-configured to filter only ICMP packets:

Note that the Stream definition is in Raw Mode, and has Bytes 12 and 13 (Ethernet Length/Type field) set to filter 08-00 (IP), and Byte 23 (IP Header Protocol field) set to filter 01 (ICMP). Same Stream definition is configured in both directions P1 → P2 and P2 → P1 to filter only ICMP packets in both directions.



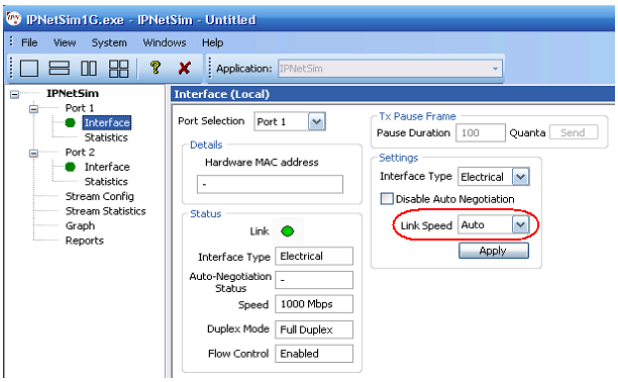
- Click on tab **WAN Emulation Parameters**. Initially impairments are not configured, and the screen appears as shown below:



Step 5: Configure Interface parameters

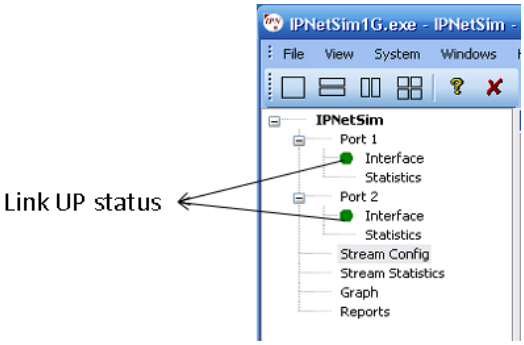
From IPNetSim function tree, double click on the Interface option, to open "Interface" in one of the window on the RHS panes, select the ports from the Port Selection drop-down list and do the following for port 1 and port2:

- Interface Type = **Electrical (or Optical if using Optical setup)**
- Link Speed = **Auto (for Electrical only, for Optical it automatically selects 1000Mbps)**
- Click on the **Apply** button (this will set the Interface Type in the hardware)
- Wait for some time as the port auto-negotiates with its link partner. Verify the following:
- Link Status = Up (indicated by the Green LED next to "Link"), Speed = 1000 Mbps. Similarly repeat the above procedure for **Port 2.**



Step 6: Verify Links

- Verify that the Link Status is UP on both ports, that is, the LHS tree should display 1G: 2 ports with green LEDs link status (refer to figure). If the LED shows red (refer to the figure), then link is down.
- Refer to troubleshooting steps below to get the links UP:
  - Check if the Electrical/Optical cables are connected to the correct ports (i.e. Ports 1 and 2 are connected) - refer to the figure above.
  - Check if there are any loose connections and secure the cables properly
  - If still link is not UP, double click **"Interface"** under the port in the LHS tree to launch the **"Interface"** dialog in one of the RHS panes. Click the **"Apply"** button. This will reinitialize the port and will force it to go through the auto negotiation cycle again.
  - The above steps should get the link UP. If problem still persists, contact GL Communications Inc.

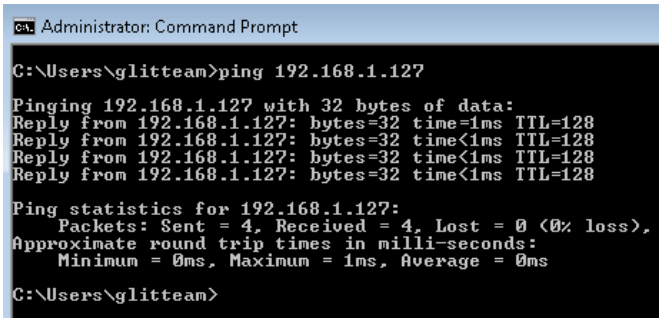


Step 7: Start IPNetSim

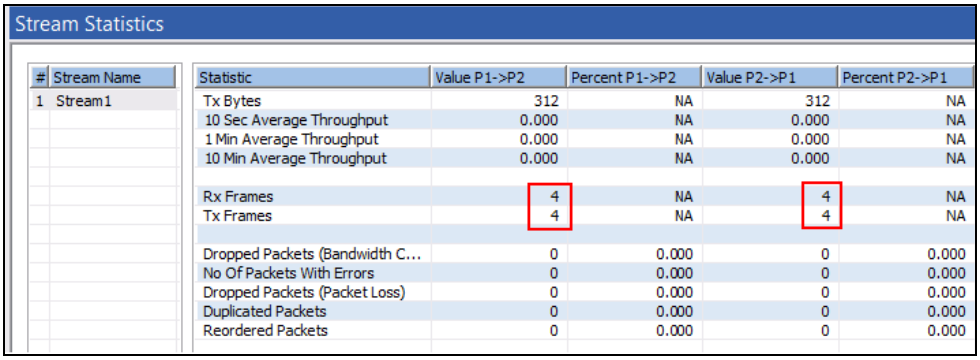
- Click **Start** to start the IPNetSim application.

Step 8: Conduct Ping Test (without impairments)

- On PC1, open a command prompt, and Ping PC2's IP Address, as shown in the figure below
- Verify that Ping works fine. **Note** that all 4 Ping trials have succeeded, with 0% loss.



- From IPNetSim function tree, click Stream Statistics option, the **"Stream Statistics"** opens in one of the window on the RHS panes. Select **Stream1**, and verify the following:



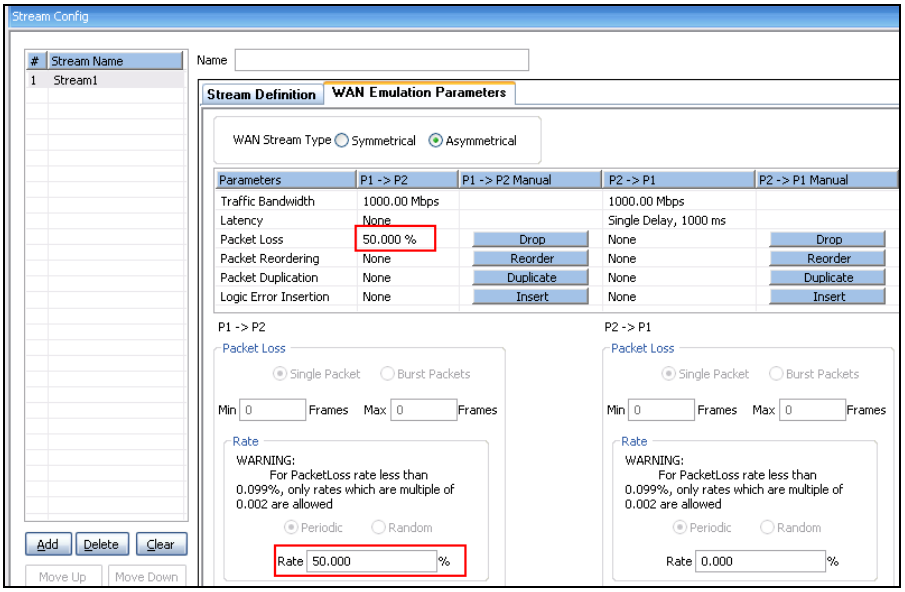
- This shows that 4 ICMP Ping request packets received on P1 was forwarded out on P2. Similarly, all 4 ICMP Ping Reply packets received on P2 was forwarded out on P1.

Statistics	Value P1→P2	Value P2→ P1
Rx Frames	4	4
Tx Frames	4	4

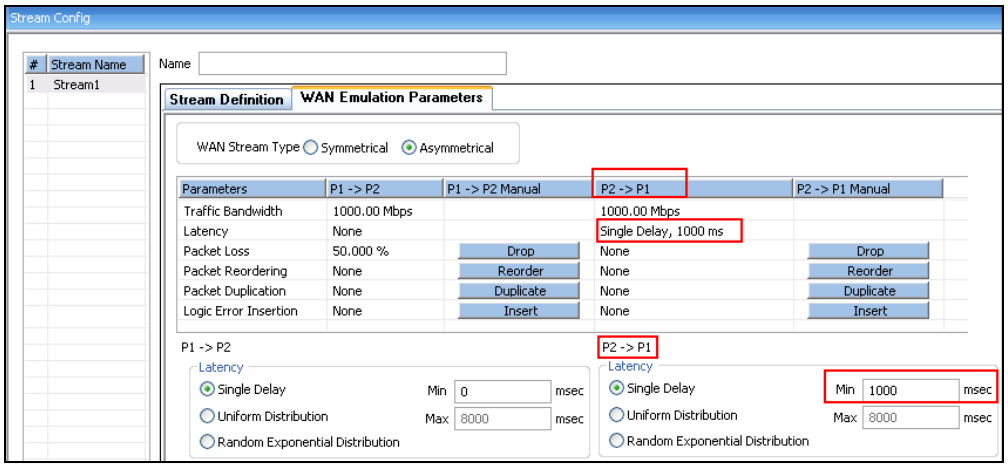
Step 9: Configure impairments – 50% packet loss in P1 → P2 direction and 1 sec constant delay in P2 → P1 direction

- Stop IPNetSim by clicking on the **Stop** button.

- On PC1, in the function tree, click **Stream Config**, and the Stream Config window opens in one of the panes on RHS. Select **Stream1**, select "**WAN Emulation Parameters**" tab, select **Packet Loss** in the Parameters list. Go to the "**Rate**" edit box at the bottom, below "**P1 → P2**" and enter **50** as shown in the figure below:



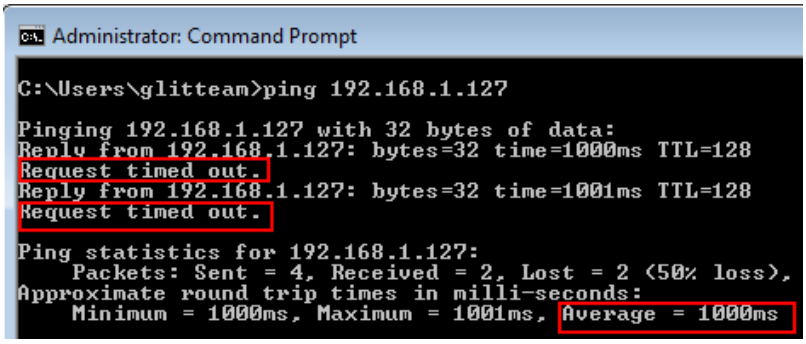
- Under P2 → P1, select **Latency** in the Parameters list. Go to the "Latency" selection at the bottom, below "P2 → P1", select "Single Delay" and enter 1000 in the Min box as shown in the figure below:



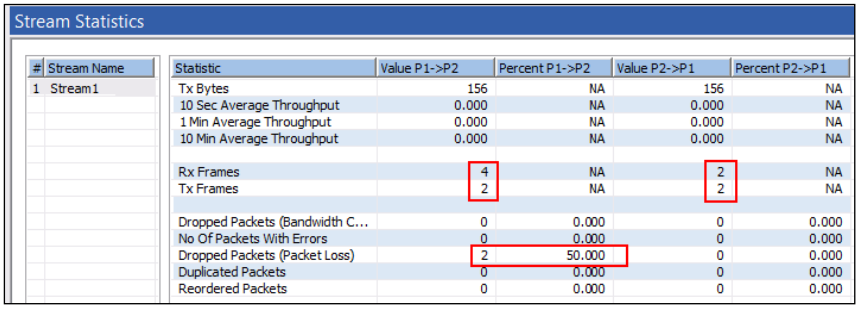
- Click "**Start**" again to restart IPNetSim with impairments.
  Note that 50% packet loss is configured in only one direction (P1 → P2). This means that every 1 out of 2 packets received on P1 will be dropped. Also, Latency of 1000 msec is configured in the reverse direction (P2 → P1). This means that every packet received on P2 will be delayed by 1000 msec.

Step 10: Conduct Ping Test (with impairments – 50% packet loss and Single Delay of 1000 msec)

- On PC1, enter the Ping command again, and verify that this time, the results shows 2 trials passed and 2 trials failed (Request timed out), with 50% loss. Also, verify that the Approximate Round trip times in milli-seconds show values around 1000 msec as shown in the figure below:



- On the PC1 IPNetSim, again open "**Stream Statistics**" and verify the following values:
  - P1 → P2 Rx Frames = 4
  - P1 → P2 Tx Frames = 2
  - P2 → P1 Tx Frames = 2
  - P2 → P1 Rx Frames = 2
  - Value P1 → P2 Dropped Packets (Packet Loss) = 2
  - Percent P1 → P2 Dropped Packets (Packet Loss) = 50.000



- This means that, P1 received 4 ICMP Ping Requests, but forwarded only 2 ICMP Ping Requests out on P2 (dropped the other 2). P2 → P1 direction does not have Packet Loss configured, so it forwards the 2 ICMP reply packets received back, out on P1, but after introducing a delay of 1000 msec, so the result displays 1000 msec round trip time.